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CLAIMS

(57) [Claim(s)]

[Claim 1] A fan comprising:

A fan motor vertically attached to a wall surface.

Space where has two or more windholes near the central part of a primary plate, an inner circumference portion of said primary plate bulges in the anti-wall surface side, and a medial surface of the swollen part stores said fan motor with said wall surface is formed, While two or more shuttlecocks are provided in the anti-wall surface side of a peripheral part of said primary plate, being rotated by said fan motor, inhaling air from the anti-fan motor side of a shaft direction and blowing off to the radial periphery side, The main fan with which it goes away from said windhole, and joins suction air after a part of air which blew off to the radial periphery side passes the circumference of said fan motor from a crevice between said primary plate and said wall surface.

An auxiliary fan which has two or more shuttlecocks which project at an approximately radial in a peripheral part of a field of a side which is attached to the anti-fan motor side of said main fan so that it may rotate with the main fan with said fan motor, and counters said main fan so that said windhole may disappear from the anti-fan motor side of a shaft direction.

[Claim 2] A fan comprising:

A fan motor vertically attached to a wall surface.

Space where has two or more windholes near the central part of a primary plate, an inner circumference portion of said primary plate bulges in the anti-wall surface side, and a medial surface of the swollen part stores said fan motor with said wall surface is formed, While two or more shuttlecocks are provided in the anti-wall surface side of a peripheral part of said primary plate, being rotated by said fan motor, inhaling air from the anti-fan motor side of a shaft direction and blowing off to the radial periphery side, The main fan with which it goes away from said windhole, and joins suction air after a part of air which blew off to the radial periphery side passes the circumference of said fan motor from a crevice between said primary plate and said wall surface.

So that said windhole may disappear from the anti-fan motor side of a shaft direction, It is attached to said main Hwang's anti-fan motor side so that it may rotate with the main fan with said fan motor, both a field of a side which counters said main Hwang, and a field by the side of the anti-main fan -- convex form near said main Hwang's central part -- abbreviated **** -- an auxiliary fan which has two or more shuttlecocks which project at an approximately radial in a peripheral part of a field of a side which is curving like and counters said main Hwang.

[Claim 3] A fan comprising:

A fan motor vertically attached to a wall surface.

Space where has two or more windholes near the central part of a primary plate, an inner circumference portion of said primary plate bulges in the anti-wall surface side, and a medial surface of the swollen part stores said fan motor with said wall surface is formed, While two or more shuttlecocks are provided in the anti-wall surface side of a peripheral part of said primary

plate, being rotated by said fan motor, inhaling air from the anti-fan motor side of a shaft direction and blowing off to the radial periphery side, The main fan with which it goes away from said windhole, and joins suction air after a part of air which blew off to the radial periphery side passes the circumference of said fan motor from a crevice between said primary plate and said wall surface.

So that said windhole may disappear from the anti-fan motor side of a shaft direction, A rotor shaft of said fan motor is made to carry out direct contact to said main Hwang's anti-fan motor side, Or it is indirectly attached to said rotor shaft via a metallic member, both a field of a side which it is rotated with said main Hwang by said fan motor, and counters said main Hwang, and a field by the side of the anti-main fan -- convex form near said main Hwang's central part -- abbreviated **** -- it curving like and, A metal auxiliary fan which has two or more shuttlecocks which project at an approximately radial in a peripheral part of a field of a side which counters said main Hwang.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Industrial Application] This invention relates to fans, such as an air conditioner.

[0002]

[Description of the Prior Art] In order that fans, such as an air conditioner, may reduce the winding temperature of the fan motor at the time of operation these days, various devices are made about cooling of a fan motor.

[0003] Conventionally, fan motor cooling methods of a fan include some which are shown in JP,2-16400,A.

[0004] Hereafter, an example of the conventional fan is explained, referring to drawings. Drawing 6 is drawing of longitudinal section of the conventional air conditioner. Drawing 7 is a part drawing of the conventional example. In drawing 6 and drawing 7, 1 is an air conditioner body of the cube type in which the bottom carried out the opening. 2 is a suction opening for inhaling indoor air into the air conditioner body 1, and is formed in the bottom center section of the air conditioner body 1. 3 is the fan motor vertically attached to the center section of the top plate via the mounting member to the wall surface of the top plate of the air conditioner body 1. 4 is the centrifugality type main fan which is attached to the rotor shaft of the fan motor 3, and is rotated by the fan motor 3. It has two or more windholes 4a near the central part (boss section) of a primary plate, the space where the inner circumference portion of said primary plate bulges in the anti-top-plate side (suction opening side), and the medial surface of the swollen part stores the fan motor 3 with the wall surface of said top plate is formed, and two or more shuttlecocks are provided in the anti-wall surface side of the peripheral part of said primary plate. 5 carries out heat exchange to the indoor air ventilated from the main fan 4 by the heat exchanger arranged within the air conditioner body 1 at the periphery side of the main fan 4. 6 is an outlet for blowing off the air by which heat exchange was carried out by the heat exchanger 5 out of the air conditioner body 1, and is formed in the bottom peripheral part of the air conditioner body 1. 7 is a wind direction deflecting plate and is built in the outlet 6.

[0005] About the fan of the air conditioner constituted as mentioned above, the operation is explained below.

[0006] First, indoor air rotates the main fan 4 from operation of the fan motor 3, and is inhaled into the air conditioner body 1 from the suction opening 2. And a wind-direction deviation is carried out with the wind direction deflecting plate 7 formed in the outlet 6, and the air by which it was ventilated to the heat exchanger 5 and heat exchange was carried out is ventilated again to the interior of a room. At this time, the flow of suction air flows through the circumference of the fan motor 3 from the crevice between flow a which flows into the heat exchanger 5 side, and the top plate of the air conditioner body 1 and the primary plate of the main fan 4, flows into two or more windholes 4a of the main fan 4 formed in the negative pressure side, and has flow b which joins a suction flow again.

[0007]

[Problem(s) to be Solved by the Invention] However, since there is little air capacity of flow b which flows through the circumference of the fan motor 3 in the above composition, there are

few chilling effects of the fan motor 3. Therefore, there was a fault that the winding temperature of the fan motor 3 was high, and a miniaturization was impossible.

[0008]An object of this invention is to provide the fan which can solve the conventional technical problem, can make the air capacity of flow b which cools a fan motor able to increase, and can raise a chilling effect.

[0009]

[Means for Solving the Problem]A fan motor with which a fan of this invention is vertically attached to a wall surface in order to attain the above-mentioned purpose, Space where has two or more windholes near the central part of a primary plate, an inner circumference portion of said primary plate bulges in the anti-wall surface side, and a medial surface of the swollen part stores said fan motor with said wall surface is formed, While two or more shuttlecocks are provided in the anti-wall surface side of a peripheral part of said primary plate, being rotated by said fan motor, inhaling air from the anti-fan motor side of a shaft direction and blowing off to the radial periphery side, The main fan with which it goes away from said windhole, and joins suction air after a part of air which blew off to the radial periphery side passes the circumference of said fan motor from a crevice between said primary plate and said wall surface, So that said windhole may disappear from the anti-fan motor side of a shaft direction, It was attached to the anti-fan motor side of said main fan so that it might rotate with the main fan with said fan motor, and a peripheral part of a field of a side which counters said main fan was equipped with an auxiliary fan which has two or more shuttlecocks which project in an approximately radial.

[0010]A fan motor with which a fan of other this inventions is vertically attached to a wall surface, Space where has two or more windholes near the central part of a primary plate, an inner circumference portion of said primary plate bulges in the anti-wall surface side, and a medial surface of the swollen part stores said fan motor with said wall surface is formed, While two or more shuttlecocks are provided in the anti-wall surface side of a peripheral part of said primary plate, being rotated by said fan motor, inhaling air from the anti-fan motor side of a shaft direction and blowing off to the radial periphery side, The main fan with which it goes away from said windhole, and joins suction air after a part of air which blew off to the radial periphery side passes the circumference of said fan motor from a crevice between said primary plate and said wall surface, So that said windhole may disappear from the anti-fan motor side of a shaft direction, It is attached to the anti-fan motor side of said main fan so that it may rotate with the main fan with said fan motor, both a field of a side which counters said main fan, and a field by the side of the anti-main fan -- convex form near the central part of said main fan -- abbreviated **** -- it was curving like and a peripheral part of a field of a side which counters said main fan was equipped with an auxiliary fan which has two or more shuttlecocks which project in an approximately radial.

[0011]A fan motor with which a fan of other this inventions is vertically attached to a wall surface, Space where has two or more windholes near the central part of a primary plate, an inner circumference portion of said primary plate bulges in the anti-wall surface side, and a medial surface of the swollen part stores said fan motor with said wall surface is formed, While two or more shuttlecocks are provided in the anti-wall surface side of a peripheral part of said primary plate, being rotated by said fan motor, inhaling air from the anti-fan motor side of a shaft direction and blowing off to the radial periphery side, The main fan with which it goes away from said windhole, and joins suction air after a part of air which blew off to the radial periphery side passes the circumference of said fan motor from a crevice between said primary plate and said wall surface, So that said windhole may disappear from the anti-fan motor side of a shaft direction, A rotor shaft of said fan motor is made to carry out direct contact to the anti-fan motor side of said main fan, or both a field of a side which it is attached to said rotor shaft, is indirectly rotated with said main fan by said fan motor via a metallic member, and counters said main fan, and a field by the side of the anti-main fan -- convex form near the central part of said main fan -- abbreviated **** -- it curving like and, A peripheral part of a field of a side which counters said main fan was equipped with the metal auxiliary fans which have two or more shuttlecocks which project in an approximately radial.

[0012]

[Function] The fan of this invention so that two or more windholes formed near the central part of the centrifugality type main fan used as the exit of the airstream which cools a fan motor may disappear from the anti-fan motor side of a shaft direction. It is attached to the anti-fan motor side of said main fan so that it may rotate with the main fan with said fan motor. By having equipped the peripheral part of the field of the side which counters said main fan with the auxiliary fan which has two or more shuttlecocks which project in an approximately radial, The pressure of the air by the side of the anti-fan motor of a windhole (suction opening side) falls rather than forward [which attaches an auxiliary fan], The pressure differential of the pressure of the air by the side of the radial periphery of the main fan and the pressure of the air by the side of the anti-fan motor of a windhole (suction opening side) becomes large, After the air which blew off to the radial periphery side passes the circumference of a fan motor from the crevice between the primary plate of the main fan, and a wall surface, it becomes easy to leave it from a windhole, and the air content which flows through the circumference of a fan motor can increase, and the chilling effect of a fan motor can be raised. Since an auxiliary fan is attached to the anti-fan motor side of the main fan so that a windhole may disappear from the anti-fan motor side of a shaft direction, the operating sound of the fan motor which leaks indoors through the windhole of the main fan can be reduced with an auxiliary fan.

[0013] both the field of the side which counters the main fan in an auxiliary fan, and the field by the side of the anti-main fan -- the convex form near the central part of the main fan -- abbreviated **** -- by having curved like, Disorder of the flow of the air in the auxiliary fan circumference can be prevented, the noise by disorder of the flow of air can be reduced, and flow characteristics can be improved.

[0014] By making an auxiliary fan into metal, and carrying out direct contact to the rotor shaft of a fan motor, or attaching to a rotor shaft indirectly via a metallic member, Heat dissipation by direct or indirect heat conduction from the rotor shaft of a fan motor to an auxiliary fan can also be performed, and the chilling effect of a fan motor can be improved further.

[0015]

[Example] Hereafter, it explains, referring to drawings for the 1st example of the fan by this invention. The portions of the former and an identical configuration attach identical codes, and the detailed explanation is omitted.

[0016] Drawing 1 is drawing of longitudinal section of the air conditioner in the 1st example of this invention. Drawing 2 is a part drawing of the example. In drawing 1 and drawing 2, 9 is an auxiliary fan which is attached to the rotor shaft of the fan motor 3 by the anti-fan motor side (suction opening 2 side) of the main fan 4, and is rotated with the main fan 4 by the fan motor 3.

Two or more shuttlecocks 9a which project in an approximately radial are formed in the peripheral part of the field of the side which counters the main fan 4 in the disc-like substrate of the auxiliary fan 9.

The radius of the substrate of the auxiliary fan 9 is made into the size that the windhole 4a of the main fan 4 disappears from the anti-fan motor side (suction opening side) of a shaft direction. The locus of the shuttlecock 9a at the time of auxiliary fan 9 rotation counters mostly the locus of the windhole 4a at the time of main fan 4 rotation.

[0017] About the fan constituted as mentioned above, the operation is explained using drawing 1 below. First, from the suction opening 2, indoor air is inhaled in the air conditioner body 1, and is ventilated by the main fan 4 to the heat exchanger 5. And the air by which heat exchange was carried out by passing the heat exchanger 5 is ventilated again to the interior of a room. At this time, the auxiliary fan 9 which rotates with the main fan 4 flows through the crevice between the top plate of the air conditioner body 1, and the primary plate of the main fan 4, and the operation which attracts flow b which passes along the windhole 4a of the main fan 4 is performed.

Therefore, the flow of flow b increases and can reduce the shell temperature of the fan motor 3.

[0018] The fan motor 3 vertically attached to the center section of the top plate via the mounting member by this example to the wall surface of the top plate of the air conditioner body 1 as mentioned above, It is attached to the rotor shaft of the fan motor 3, and has two or more windholes 4a near the central part (boss section) of a primary plate, The space where the inner

circumference portion of said primary plate bulges in the anti-top-plate side (suction opening 2 side), and the medial surface of the swollen part stores the fan motor 3 with the wall surface of said top plate is formed, While two or more shuttlecocks are provided in the anti-wall surface side of the peripheral part of said primary plate, being rotated by the fan motor 3, inhaling air from the anti-fan motor side (suction opening 2 side) of a shaft direction and blowing off to the radial periphery side (heat exchanger 5 side), The main fan 4 with which it goes away from the windhole 4a, and joins suction air after a part of air which blew off to the radial periphery side passes the circumference of the fan motor 3 from the crevice between the wall surfaces of said primary plate and said top plate, It is attached to the anti-fan motor side (suction opening 2 side) of the main fan 4 at the rotor shaft of the fan motor 3, is rotated with the main fan 4 by the fan motor 3, and has a disc-like substrate of a size with which the windhole 4a disappears from the anti-fan motor side (suction opening 2 side) of a shaft direction, Since the peripheral part of the field of the side which counters the main fan 4 in said disc-like substrate was equipped with the auxiliary fan 9 which has two or more shuttlecocks 9a which project in an approximately radial, the air flow rate which flows through the circumference of the fan motor 3 increases, lowers the shell temperature of the fan motor 3, and can reduce winding temperature. The auxiliary fan 9 attached to the anti-fan motor side (suction opening 2 side) of the main fan 4, Since the windhole 4a has a disc-like substrate of the size which disappears from the anti-fan motor side (suction opening 2 side) of a shaft direction, the operating sound of the fan motor 3 which leaks indoors through the windhole 4a of the main fan 4 can be reduced.

[0019]Next, it explains, referring to drawings for the fan of the 2nd example of the fan by this invention. The portions of the former and an identical configuration attach identical codes, and the detailed explanation is omitted.

[0020]Drawing 3 is drawing of longitudinal section of the air conditioner in the 2nd example of this invention. Drawing 4 is a part drawing of the example. In drawing 3 and drawing 4, 10 is an auxiliary fan which is attached to the rotor shaft of the fan motor 3 by the anti-fan motor side (suction opening 2 side) of the main fan 4, and is rotated with the main fan 4 by the fan motor 3. both the near field where the substrate of the auxiliary fan 10 counters the main fan 4, and the field by the side of the anti-main fan -- the convex form near the central part (boss section) of the main fan 4 -- abbreviated **** -- it curving like and, Two or more shuttlecocks 10a which project in an approximately radial are formed in the peripheral part of the field of the side which counters the main fan 4 in the substrate of the auxiliary fan 10.

The radius of the substrate of the auxiliary fan 10 is made larger than the distance from the axis of rotation to the periphery side edge of the edge of the windhole 4a of the main fan 4, and the distance from the axis of rotation to the periphery side edge of the shuttlecock 10a so that the windhole 4a of the main fan 4 may disappear from the anti-fan motor side (suction opening side) of a shaft direction. The locus of the shuttlecock 10a at the time of auxiliary fan 10 rotation shifts to the periphery side more slightly than the locus of the windhole 4a at the time of main fan 4 rotation.

[0021]About the fan constituted as mentioned above, the operation is explained using drawing 3 below. Indoor air is first ventilated to the heat exchanger 5 by the main fan 4 which is absorbed in the air conditioner body 1 and rotated by the fan motor 3 from the suction opening 2. And the air by which heat exchange was carried out by passing the heat exchanger 5 is ventilated again to the interior of a room. At this time, the auxiliary fan 10 which rotates with the main fan 4, Since the operation which attracts flow b which flows through the crevice between the top plate of the air conditioner body 1 and the primary plate of the main fan 4, and passes along the windhole 4a of the main fan 4 is performed, the air flow rate which flows through the circumference of the fan motor 3 increases, and can reduce the shell temperature of the fan motor 3. both the near field where the substrate of the auxiliary fan 10 counters the main fan 4, and the field by the side of the anti-main fan -- the convex form near the central part (boss section) of the main fan 4 -- abbreviated **** -- since it is curving like, a wind-direction deviation is carried out with the auxiliary fan 10, and flow b from the windhole 4a of the main fan 4 blows off to the shuttlecock side. Since the wind-direction deviation of the flow from the suction opening 2 side is carried out so that the primary plate of the main fan 4 may be met,

disorder of the flow of the air of the auxiliary fan 10 circumference can also be lessened.

[0022]The fan motor 3 vertically attached to the center section of the top plate via the mounting member by this example to the wall surface of the top plate of the air conditioner body 1 as mentioned above, It is attached to the rotor shaft of the fan motor 3, and has two or more windholes 4a near the central part (boss section) of a primary plate, The space where the inner circumference portion of said primary plate bulges in the anti-top-plate side (suction opening 2 side), and the medial surface of the swollen part stores the fan motor 3 with the wall surface of said top plate is formed, While two or more shuttlecocks are provided in the anti-wall surface side of the peripheral part of said primary plate, being rotated by the fan motor 3, inhaling air from the anti-fan motor side (suction opening 2 side) of a shaft direction and blowing off to the radial periphery side (heat exchanger 5 side), The main fan 4 with which it goes away from the windhole 4a, and joins suction air after a part of air which blew off to the radial periphery side passes the circumference of the fan motor 3 from the crevice between the wall surfaces of said primary plate and said top plate, It is attached to the anti-fan motor side (suction opening 2 side) of the main fan 4 at the rotor shaft of the fan motor 3, is rotated with the main fan 4 by the fan motor 3, and has a substrate of a size with which the windhole 4a disappears from the anti-fan motor side (suction opening 2 side) of a shaft direction, both the near field where said substrate counters the main fan 4, and the field by the side of the anti-main fan -- the convex form near the central part (boss section) of the main fan 4 -- abbreviated *** -- it curving like and, Since the peripheral part of the field of the side which counters the main fan 4 in said substrate was equipped with the auxiliary fan 10 which has two or more shuttlecocks 10a which project in an approximately radial, the air flow rate which flows through the circumference of the fan motor 3 increases, the shell temperature of the fan motor 3 is lowered, and winding temperature can be reduced. The auxiliary fan 10 attached to the anti-fan motor side (suction opening 2 side) of the main fan 4, Since the windhole 4a had a substrate of the size which disappears from the anti-fan motor side (suction opening 2 side) of a shaft direction and has covered widely the suction opening 2 side of the windhole 4a, the operating sound of the fan motor 3 which leaks indoors through the windhole 4a of the main fan 4 can fully be reduced. Since there is also little disorder of the flow of the air of the auxiliary fan 10 circumference with the curved shape of the auxiliary fan 10, while being able to reduce the noise by disorder of the flow of air, flow characteristics can also improve.

[0023]It explains referring to drawings for the fan of the 3rd example of the fan by this invention. The portions of the former and an identical configuration attach identical codes, and the detailed explanation is omitted.

[0024]Drawing 5 is drawing of longitudinal section of the air conditioner in the 3rd example of this invention. In drawing 5, 11 is an auxiliary fan made from aluminum which makes carry out direct contact to the rotor shaft 3a of the fan motor 3 by the anti-fan motor side (suction opening 2 side) of the main fan 4, is attached, and is rotated with the main fan 4 by the fan motor 3.

both the near field where the substrate of the auxiliary fan 11 counters the main fan 4, and the field by the side of the anti-main fan -- the convex form near the central part (boss section) of the main fan 4 -- abbreviated *** -- it curving like and, Two or more shuttlecocks 11a which project in an approximately radial are formed in the peripheral part of the field of the side which counters the main fan 4 in the substrate of the auxiliary fan 11.

The radius of the substrate of the auxiliary fan 11 is made larger than the distance from the axis of rotation to the periphery side edge of the edge of the windhole 4a of the main fan 4, and the distance from the axis of rotation to the periphery side edge of the shuttlecock 11a so that the windhole 4a of the main fan 4 may disappear from the anti-fan motor side (suction opening side) of a shaft direction. The locus of the shuttlecock 11a at the time of auxiliary fan 11 rotation shifts to the periphery side more slightly than the locus of the windhole 4a at the time of main fan 4 rotation.

[0025]About the fan constituted as mentioned above, the operation is explained using drawing 5 below. Indoor air is first ventilated to the heat exchanger 5 by the main fan 4 which is absorbed in the air conditioner body 1 and rotated by the fan motor 3 from the suction opening 2. And the

air by which heat exchange was carried out by passing the heat exchanger 5 is ventilated again to the interior of a room. At this time, the auxiliary fan 11 made from aluminum which rotates with the main fan 4, Since the flow which flows through the crevice between the top plate of the air conditioner body 1 and the primary plate of the main fan 4, attracts flow b which passes along the windhole 4a of the main fan 4, and flows through the circumference of the fan motor 3 can be increased, While being able to cool the coat of the fan motor 3, the auxiliary fan 11, Since it comprises aluminum which is metal excellent in thermal conductivity and direct contact is carried out to the rotor shaft 3a of the fan motor 3, heat dissipation by direct heat conduction from the rotor shaft 3a of the fan motor 3 to the auxiliary fan 11 can also be performed, and the chilling effect of a fan motor can be improved further. both the near field where the substrate of the auxiliary fan 11 counters the main fan 4, and the field by the side of the anti-main fan -- the convex form near the central part (boss section) of the main fan 4 -- abbreviated *** -- since it is curving like, a wind-direction deviation is carried out with the auxiliary fan 11, and flow b from the windhole 4a of the main fan 4 blows off to the shuttlecock side. Since the wind-direction deviation of the flow from the suction opening 2 side is carried out so that the primary plate of the main fan 4 may be met, disorder of the flow of the air of the auxiliary fan 11 circumference can also be lessened.

[0026]The fan motor 3 vertically attached to the center section of the top plate via the mounting member by this example to the wall surface of the top plate of the air conditioner body 1 as mentioned above, It is attached to the rotor shaft of the fan motor 3, and has two or more windholes 4a near the central part (boss section) of a primary plate, The space where the inner circumference portion of said primary plate bulges in the anti-top-plate side (suction opening 2 side), and the medial surface of the swollen part stores the fan motor 3 with the wall surface of said top plate is formed, While two or more shuttlecocks are provided in the anti-wall surface side of the peripheral part of said primary plate, being rotated by the fan motor 3, inhaling air from the anti-fan motor side (suction opening 2 side) of a shaft direction and blowing off to the radial periphery side (heat exchanger 5 side), The main fan 4 with which it goes away from the windhole 4a, and joins suction air after a part of air which blew off to the radial periphery side passes the circumference of the fan motor 3 from the crevice between the wall surfaces of said primary plate and said top plate, Carry out direct contact to the rotor shaft 3a of the fan motor 3, and it is attached to the anti-fan motor side (suction opening 2 side) of the main fan 4, and is rotated with the main fan 4 by the fan motor 3, It has a substrate of a size with which the windhole 4a disappears from the anti-fan motor side (suction opening 2 side) of a shaft direction, both the near field where said substrate counters the main fan 4, and the field by the side of the anti-main fan -- the convex form near the central part (boss section) of the main fan 4 -- abbreviated *** -- it curving like and, Since the peripheral part of the field of the side which counters the main fan 4 in said substrate was equipped with the auxiliary fan 11 made from aluminum which has two or more shuttlecocks 11a which project in an approximately radial, the air flow rate which flows through the circumference of the fan motor 3 increases, the shell temperature of the fan motor 3 is lowered, and winding temperature can be reduced. Since the auxiliary fan 11 comprises aluminum which is metal excellent in thermal conductivity and direct contact is carried out to the rotor shaft 3a of the fan motor 3, Heat dissipation by direct heat conduction from the rotor shaft 3a of the fan motor 3 to the auxiliary fan 11 can also be performed, and the chilling effect of a fan motor can be improved further. The auxiliary fan 11 attached to the anti-fan motor side (suction opening 2 side) of the main fan 4, Since the windhole 4a had a substrate of the size which disappears from the anti-fan motor side (suction opening 2 side) of a shaft direction and has covered widely the suction opening 2 side of the windhole 4a, the operating sound of the fan motor 3 which leaks indoors through the windhole 4a of the main fan 4 can fully be reduced. Since there is also little disorder of the flow of the air of the auxiliary fan 11 circumference with the curved shape of the auxiliary fan 11, while being able to reduce the noise by disorder of the flow of air, flow characteristics can also improve. Although direct contact of the metal auxiliary fans 11 was carried out to the rotor shaft 3a of the fan motor 3 and they are attached in this example, the same effect is acquired even if it attaches to the rotor shaft 3a indirectly via a metallic member.

[0027]

[Effect of the Invention] As mentioned above, the fan of this invention so that two or more windholes formed near the central part of the centrifugality type main fan used as the exit of the airstream which cools a fan motor may disappear from the anti-fan motor side of a shaft direction, It is attached to the anti-fan motor side of said main fan so that it may rotate with the main fan with said fan motor, By having equipped the peripheral part of the field of the side which counters said main fan with the auxiliary fan which has two or more shuttlecocks which project in an approximately radial, the air content which flows through the circumference of a fan motor and cools the coat of a fan motor can increase, and the chilling effect of a fan motor can be raised. The operating sound of the fan motor which leaks indoors through the windhole of the main fan can be reduced.

[0028] both the field of the side which counters the main fan in an auxiliary fan, and the field by the side of the anti-main fan -- the convex form near the central part of the main fan -- abbreviated **** -- by having curved like, Disorder of the flow of the air in the auxiliary fan circumference can be prevented, the noise by disorder of the flow of air can be reduced, and flow characteristics can be improved.

[0029] By making an auxiliary fan into metal, and carrying out direct contact to the rotor shaft of a fan motor, or attaching to a rotor shaft indirectly via a metallic member, Heat dissipation by direct or indirect heat conduction from the rotor shaft of a fan motor to an auxiliary fan can also be performed, and the chilling effect of a fan motor can be improved further.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Drawing of longitudinal section of the air conditioner in the 1st example of this invention

[Drawing 2] The part drawing in the example

[Drawing 3] Drawing of longitudinal section of the air conditioner in the 2nd example of this invention

[Drawing 4] The part drawing in the example

[Drawing 5] Drawing of longitudinal section of the air conditioner in the 3rd example of this invention

[Drawing 6] Drawing of longitudinal section of the conventional air conditioner

[Drawing 7] The part drawing in the example

[Description of Notations]

3 Fan motor

3a Rotor shaft

4 The main fan

4a Windhole

9 Auxiliary fan

10 Auxiliary fan

11 The auxiliary fan made from aluminum

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(54)【発明の名称】 送風機

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(57)【特許請求の範囲】

【請求項1】 壁面に対して垂直に取り付けられるファンモータと、
主板の中心部近傍に複数の風穴を有し、前記主板の内周
部分が反壁面側に膨出されてその膨出部分の内側面が前
記壁面とともに前記ファンモータを収納する空間を形成
し、前記主板の外周部の反壁面側に複数の羽根が設けられ、
前記ファンモータにより回転させられて、回転軸方
向の反ファンモータ側から空気を吸い込み、半径方向外
周側に吹き出すとともに、半径方向外周側に吹き出され
た空気の一部が、前記主板と前記壁面との隙間から前記
ファンモータの周囲を通過した後に前記風穴から出で
ていき吸引空気と合流する主ファンと、
前記風穴が回転軸方向の反ファンモータ側から見えなく
なるように、前記主ファンの反ファンモータ側に、前記

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ファンモータにより主ファンとともに回転するように取
り付けられ、前記主ファンに対向する側の面の外周部に
略放射状に突出する複数の羽根を有する補助ファンとを
備えた送風機。

【請求項2】 壁面に対して垂直に取り付けられるファンモータと、
主板の中心部近傍に複数の風穴を有し、前記主板の内周
部分が反壁面側に膨出されてその膨出部分の内側面が前
記壁面とともに前記ファンモータを収納する空間を形成
し、前記主板の外周部の反壁面側に複数の羽根が設けられ、
前記ファンモータにより回転させられて、回転軸方
向の反ファンモータ側から空気を吸い込み、半径方向外
周側に吹き出すとともに、半径方向外周側に吹き出され
た空気の一部が、前記主板と前記壁面との隙間から前記
ファンモータの周囲を通過した後に前記風穴から出で
てい

き吸い込み空気と合流する主ファンと、前記風穴が回転軸方向の反ファンモータ側から見えなくなるように、前記主ファンの反ファンモータ側に、前記ファンモータにより主ファンとともに回転するように取り付けられ、前記主ファンに対向する側の面と反主ファン側の面の両方が前記主ファンの中心部近傍の凸面形状に略沿うように湾曲しており、前記主ファンに対向する側の面の外周部に略放射状に突出する複数の羽根を有する補助ファンとを備えた送風機。

【請求項3】 壁面に対して垂直に取り付けられるファンモータと、

主板の中心部近傍に複数の風穴を有し、前記主板の内周部分が反壁面側に膨出されてその膨出部分の内側面が前記壁面とともに前記ファンモータを収納する空間を形成し、前記主板の外周部の反壁面側に複数の羽根が設けられ、前記ファンモータにより回転させられて、回転軸方向の反ファンモータ側から空気を吸い込み、半径方向外周側に吹き出すとともに、半径方向外周側に吹き出された空気の一部が、前記主板と前記壁面との隙間から前記ファンモータの周囲を通過した後に前記風穴から出ていき吸い込み空気と合流する主ファンと、

前記風穴が回転軸方向の反ファンモータ側から見えなくなるように、前記主ファンの反ファンモータ側に、前記ファンモータのロータシャフトに直接接触させて、または金属部材を介して間接的に、前記ロータシャフトに取り付けられ、前記ファンモータにより前記主ファンとともに回転させられ、前記主ファンに対向する側の面と反主ファン側の面の両方が前記主ファンの中心部近傍の凸面形状に略沿うように湾曲しており、前記主ファンに対向する側の面の外周部に略放射状に突出する複数の羽根を有する金属製補助ファンとを備えた送風機。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は空気調和機等の送風機に関するものである。

【0002】

【従来の技術】 最近、空気調和機等の送風機は、運転時のファンモータの巻線温度を低減するために、ファンモータの冷却に関して種々の工夫がなされている。

【0003】 従来、送風機のファンモータ冷却方法としては、特開平2-16400号公報に示されているものがある。

【0004】 以下、図面を参考しながら従来の送風機の一例について説明する。図6は、従来の空気調和機の縦断面図である。また、図7は同従来例の部品図である。図6、図7において、1は底面が開口した箱形の空気調和機本体である。2は空気調和機本体1内へ室内空気を吸い込むための吸込口で、空気調和機本体1の底面中央部に形成されている。3は空気調和機本体1の天板の壁面に対して垂直に、取付部材を介して天板の中央部に取

り付けられたファンモータである。4はファンモータ3のロータシャフトに取り付けられファンモータ3により回転させられる遠心型の主ファンであり、主板の中心部(ボス部)近傍に複数の風穴4aを有し、前記主板の内周部分が反天板側(吸込口側)に膨出されてその膨出部分の内側面が前記天板の壁面とともにファンモータ3を収納する空間を形成し、前記主板の外周部の反壁面側に複数の羽根が設けられている。5は空気調和機本体1内で主ファン4の外周側に配置された熱交換器で主ファン4より送風された室内空気と熱交換する。6は熱交換器5で熱交換された空気を空気調和機本体1外へ吹き出すための吹出口で、空気調和機本体1の底面外周部に形成されている。7は風向偏向板であり、吹出口6に内蔵される。

【0005】 以上のように構成された空気調和機の送風機について、以下その動作について説明する。

【0006】 まず、室内空気はファンモータ3の運転により主ファン4を回転させ、吸込口2より空気調和機本体1内へ吸い込まれる。そして、熱交換器5へ送風され、熱交換された空気は吹出口6内に設けられた風向偏向板7で風向偏向されて、再び室内へ送風される。このとき、吸い込み空気の流れは熱交換器5側へ流れる流れaと、空気調和機本体1の天板と主ファン4の主板との隙間からファンモータ3の周囲を流れ、負圧側に設けた主ファン4の複数の風穴4aへ流れ、再び吸い込み流れに合流する流れbとがある。

【0007】

【発明が解決しようとする課題】 しかしながら、上記のような構成では、ファンモータ3の周囲を流れる流れbの風量が少ないために、ファンモータ3の冷却効果が少ない。そのため、ファンモータ3の巻線温度が高く、小型化ができないという欠点があった。

【0008】 本発明は、従来の課題を解決するもので、ファンモータを冷却する流れbの風量を増加させ、冷却効果を向上させることのできる送風機を提供することを目的とする。

【0009】

【課題を解決するための手段】 上記目的を達成するため本発明の送風機は、壁面に対して垂直に取り付けられるファンモータと、主板の中心部近傍に複数の風穴を有し、前記主板の内周部分が反壁面側に膨出されてその膨出部分の内側面が前記壁面とともに前記ファンモータを収納する空間を形成し、前記主板の外周部の反壁面側に複数の羽根が設けられ、前記ファンモータにより回転させられて、回転軸方向の反ファンモータ側から空気を吸い込み、半径方向外周側に吹き出すとともに、半径方向外周側に吹き出された空気の一部が、前記主板と前記壁面との隙間から前記ファンモータの周囲を通過した後に前記風穴から出ていき吸い込み空気と合流する主ファンと、前記風穴が回転軸方向の反ファンモータ側から見え

なくなるように、前記主ファンの反ファンモータ側に、前記ファンモータにより主ファンとともに回転するよう取り付けられ、前記主ファンに対向する側の面の外周部に略放射状に突出する複数の羽根を有する補助ファンとを備えたのである。

【0010】また、他の本発明の送風機は、壁面に対して垂直に取り付けられるファンモータと、主板の中心部近傍に複数の風穴を有し、前記主板の内周部分が反壁面側に膨出されてその膨出部分の内側面が前記壁面とともに前記ファンモータを収納する空間を形成し、前記主板の外周部の反壁面側に複数の羽根が設けられ、前記ファンモータにより回転させられて、回転軸方向の反ファンモータ側から空気を吸い込み、半径方向外周側に吹き出すとともに、半径方向外周側に吹き出された空気の一部が、前記主板と前記壁面との隙間から前記ファンモータの周囲を通過した後に前記風穴から出ていき吸い込み空気と合流する主ファンと、前記風穴が回転軸方向の反ファンモータ側から見えなくなるように、前記主ファンの反ファンモータ側に、前記ファンモータにより主ファンとともに回転するよう取り付けられ、前記主ファンに対向する側の面と反主ファン側の面の両方が前記主ファンの中心部近傍の凸面形状に略沿うように湾曲しており、前記主ファンに対向する側の面の外周部に略放射状に突出する複数の羽根を有する補助ファンとを備えたのである。

【0011】さらに、他の本発明の送風機は、壁面に対して垂直に取り付けられるファンモータと、主板の中心部近傍に複数の風穴を有し、前記主板の内周部分が反壁面側に膨出されてその膨出部分の内側面が前記壁面とともに前記ファンモータを収納する空間を形成し、前記主板の外周部の反壁面側に複数の羽根が設けられ、前記ファンモータにより回転させられて、回転軸方向の反ファンモータ側から空気を吸い込み、半径方向外周側に吹き出すとともに、半径方向外周側に吹き出された空気の一部が、前記主板と前記壁面との隙間から前記ファンモータの周囲を通過した後に前記風穴から出ていき吸い込み空気と合流する主ファンと、前記風穴が回転軸方向の反ファンモータ側から見えなくなるように、前記主ファンの反ファンモータ側に、前記ファンモータのロータシャフトに直接接触させて、または金属部材を介して間接的に、前記ロータシャフトに取り付けられ、前記ファンモータにより前記主ファンとともに回転させられ、前記主ファンに対向する側の面と反主ファン側の面の両方が前記主ファンの中心部近傍の凸面形状に略沿うように湾曲しており、前記主ファンに対向する側の面の外周部に略放射状に突出する複数の羽根を有する金属製補助ファンとを備えたのである。

【0012】

【作用】本発明の送風機は、ファンモータを冷却する空気流の出口となる遠心型の主ファンの中心部近傍に形成

された複数の風穴が回転軸方向の反ファンモータ側から見えなくなるように、前記主ファンの反ファンモータ側に、前記ファンモータにより主ファンとともに回転するよう取り付けられ、前記主ファンに対向する側の面の外周部に略放射状に突出する複数の羽根を有する補助ファンを備えたことにより、補助ファンを取り付ける前よりも風穴の反ファンモータ側（吸込口側）の空気の圧力が下がり、主ファンの半径方向外周側の空気の圧力と風穴の反ファンモータ側（吸込口側）の空気の圧力との圧力差が大きくなつて、半径方向外周側に吹き出された空気が、主ファンの主板と壁面との隙間からファンモータの周囲を通過した後に風穴から出ていき易くなり、ファンモータの周囲を流れる空気量が増大し、ファンモータの冷却効果を向上させることができる。また、補助ファンは、風穴が回転軸方向の反ファンモータ側から見えなくなるように、主ファンの反ファンモータ側に取り付けられるので、主ファンの風穴を通じて室内に漏れてくるファンモータの運転音を補助ファンにより低減できる。

【0013】また、さらに、補助ファンを、主ファンに対向する側の面と反主ファン側の面の両方が主ファンの中心部近傍の凸面形状に略沿うように湾曲したものとすることにより、補助ファン周辺での空気の流れの乱れを防止でき、空気の流れの乱れによる騒音を低減でき、流量特性を向上できる。

【0014】さらに、補助ファンを金属製とし、ファンモータのロータシャフトに直接接触させて、または金属部材を介して間接的に、ロータシャフトに取り付けることにより、ファンモータのロータシャフトから補助ファンへの直接的または間接的熱伝導による放熱もでき、さらにファンモータの冷却効果を向上できる。

【0015】

【実施例】以下、本発明による送風機の第1の実施例について図面を参照しながら説明する。尚、従来と同一構成の部分は同一符号を付し、その詳細な説明は省略する。

【0016】図1は、本発明の第1の実施例における空気調和機の縦断面図である。図2は同実施例の部品図である。図1、図2において、9は、主ファン4の反ファンモータ側（吸込口2側）でファンモータ3のロータシャフトに取り付けられファンモータ3により主ファン4とともに回転させられる補助ファンであり、補助ファン9の円盤状の基板における主ファン4に対向する側の面の外周部には略放射状に突出する複数の羽根9aが設けられている。なお、補助ファン9の基板の半径は、主ファン4の風穴4aが回転軸方向の反ファンモータ側（吸込口側）から見えなくなるような大きさにしている。また、補助ファン9回転時の羽根9aの軌跡が、主ファン4回転時の風穴4aの軌跡にほぼ対向するようになっている。

50 【0017】以上のように構成された送風機について、

以下図1を用いてその動作を説明する。まず、室内空気は、吸込口2より空気調和機本体1内に吸い込まれ、主ファン4によって熱交換器5へ送風される。そして、熱交換器5を通過して熱交換された空気は再び室内へ送風される。このとき、主ファン4と共に回転する補助ファン9は、空気調和機本体1の天板と主ファン4の主板との隙間を流れ、主ファン4の風穴4aを通る流れbを吸引する作用を行う。そのため、流れbの流量は増大し、ファンモータ3の外殻温度を低減できる。

【0018】以上のように本実施例では、空気調和機本体1の天板の壁面に対して垂直に、取付部材を介して天板の中央部に取り付けられたファンモータ3と、ファンモータ3のロータシャフトに取り付けられ、主板の中心部（ボス部）近傍に複数の風穴4aを有し、前記主板の内周部分が反天板側（吸込口2側）に膨出されてその膨出部分の内側面が前記天板の壁面とともにファンモータ3を収納する空間を形成し、前記主板の外周部の反壁面側に複数の羽根が設けられ、ファンモータ3により回転させられて、回転軸方向の反ファンモータ側（吸込口2側）から空気を吸い込み、半径方向外周側（熱交換器5側）に吹き出すとともに、半径方向外周側に吹き出された空気の一部が、前記主板と前記天板の壁面との隙間からファンモータ3の周囲を通過した後に風穴4aから出ていき吸い込み空気と合流する主ファン4と、主ファン4の反ファンモータ側（吸込口2側）に、ファンモータ3のロータシャフトに取り付けられファンモータ3により主ファン4とともに回転させられ、風穴4aが回転軸方向の反ファンモータ側（吸込口2側）から見えなくなる大きさの円盤状の基板を有し、前記円盤状の基板における主ファン4に対向する側の面の外周部に略放射状に突出する複数の羽根9aを有する補助ファン9とを備えたので、ファンモータ3の周囲を流れる空気流量は増大し、ファンモータ3の外殻温度を下げて巻線温度を低減できる。また、主ファン4の反ファンモータ側（吸込口2側）に取り付けられる補助ファン9は、風穴4aが回転軸方向の反ファンモータ側（吸込口2側）から見えなくなる大きさの円盤状の基板を有するので、主ファン4の風穴4aを通って室内に漏れてくるファンモータ3の運転音を低減できる。

【0019】次に、本発明による送風機の第2実施例の送風機について図面を参照しながら説明する。尚、従来と同一構成の部分は同一符号を付し、その詳細な説明は省略する。

【0020】図3は、本発明の第2の実施例における空気調和機の縦断面図である。図4は同実施例の部品図である。図3、図4において、10は、主ファン4の反ファンモータ側（吸込口2側）でファンモータ3のロータシャフトに取り付けられファンモータ3により主ファン4とともに回転させられる補助ファンであり、補助ファン10の基板は、主ファン4に対向する側の面と反主

アン側の面の両方が主ファン4の中心部（ボス部）近傍の凸面形状に略沿うように湾曲しており、補助ファン10の基板における主ファン4に対向する側の面の外周部には略放射状に突出する複数の羽根10aが設けられている。なお、補助ファン10の基板の半径は、主ファン4の風穴4aが回転軸方向の反ファンモータ側（吸込口側）から見えなくなるように、回転軸から主ファン4の風穴4aの縁の外周側端までの距離、及び、回転軸から羽根10aの外周側端までの距離より大きくしている。また、補助ファン10回転時の羽根10aの軌跡が、主ファン4回転時の風穴4aの軌跡よりわずかに外周側にずれるようになっている。

【0021】以上のように構成された送風機について、以下図3を用いてその動作を説明する。まず室内空気は、吸込口2より空気調和機本体1内に吸い込まれファンモータ3によって回転させられた主ファン4により熱交換器5へ送風される。そして、熱交換器5を通過して熱交換された空気は再び室内へ送風される。このとき、主ファン4と共に回転する補助ファン10は、空気調和機本体1の天板と主ファン4の主板との隙間を流れ、主ファン4の風穴4aを通る流れbを吸引する作用を行うので、ファンモータ3の周囲を流れる空気流量は増大し、ファンモータ3の外殻温度を低減できる。また、補助ファン10の基板は、主ファン4に対向する側の面と反主ファン側の面の両方が主ファン4の中心部（ボス部）近傍の凸面形状に略沿うように湾曲しているため、主ファン4の風穴4aからの流れbは補助ファン10で風向偏向されて羽根側へ吹き出す。さらに、吸込口2側からの流れを主ファン4の主板に沿うように風向偏向するので、補助ファン10周辺の空気の流れの乱れも少なくできる。

【0022】以上のように本実施例では、空気調和機本体1の天板の壁面に対して垂直に、取付部材を介して天板の中央部に取り付けられたファンモータ3と、ファンモータ3のロータシャフトに取り付けられ、主板の中心部（ボス部）近傍に複数の風穴4aを有し、前記主板の内周部分が反天板側（吸込口2側）に膨出されてその膨出部分の内側面が前記天板の壁面とともにファンモータ3を収納する空間を形成し、前記主板の外周部の反壁面側に複数の羽根が設けられ、ファンモータ3により回転させられて、回転軸方向の反ファンモータ側（吸込口2側）から空気を吸い込み、半径方向外周側（熱交換器5側）に吹き出すとともに、半径方向外周側に吹き出された空気の一部が、前記主板と前記天板の壁面との隙間からファンモータ3の周囲を通過した後に風穴4aから出ていき吸い込み空気と合流する主ファン4と、主ファン4の反ファンモータ側（吸込口2側）に、ファンモータ3のロータシャフトに取り付けられファンモータ3により主ファン4とともに回転させられ、風穴4aが回転軸方向の反ファンモータ側（吸込口2側）から見えなくな

る大きさの基板を有し、前記基板は主ファン4に対向する側の面と反主ファン側の面の両方が主ファン4の中心部（ボス部）近傍の凸面形状に略沿うように湾曲しており、前記基板における主ファン4に対向する側の面の外周部に略放射状に突出する複数の羽根10aを有する補助ファン10とを備えたので、ファンモータ3の周囲を流れる空気流量が増大し、ファンモータ3の外殻温度を下げて巻線温度を低減できる。また、主ファン4の反ファンモータ側（吸込口2側）に取り付けられる補助ファン10は、風穴4aが回転軸方向の反ファンモータ側（吸込口2側）から見えなくなる大きさの基板を有し、風穴4aの吸込口2側を広く覆っているので、主ファン4の風穴4aを通って室内に漏れてくるファンモータ3の運転音を十分に低減できる。さらに、補助ファン10の湾曲形状により補助ファン10周辺の空気の流れの乱れも少ないので空気の流れの乱れによる騒音を低減できるとともに、流量特性も向上できる。

【0023】さらに、本発明による送風機の第3実施例の送風機について図面を参照しながら説明する。尚、従来と同一構成の部分は同一符号を付し、その詳細な説明は省略する。

【0024】図5は、本発明の第3の実施例における空気調和機の縦断面図である。図5において、11は、主ファン4の反ファンモータ側（吸込口2側）でファンモータ3のロータシャフト3aに直接接触させて取り付けられファンモータ3により主ファン4とともに回転せられるアルミニウム製の補助ファンであり、補助ファン11の基板は、主ファン4に対向する側の面と反主ファン側の面の両方が主ファン4の中心部（ボス部）近傍の凸面形状に略沿うように湾曲しており、補助ファン11の基板における主ファン4に対向する側の面の外周部には略放射状に突出する複数の羽根11aが設けられている。なお、補助ファン11の基板の半径は、主ファン4の風穴4aが回転軸方向の反ファンモータ側（吸込口側）から見えなくなるように、回転軸から主ファン4の風穴4aの縁の外周側端までの距離、及び、回転軸から羽根11aの外周側端までの距離より大きくなっている。また、補助ファン11回転時の羽根11aの軌跡が、主ファン4回転時の風穴4aの軌跡よりわずかに外周側にずれるようになっている。

【0025】以上のように構成された送風機について、以下図5を用いてその動作を説明する。まず室内空気は、吸込ロ 2より空気調和機本体1内に吸い込まれファンモータ3によって回転させられた主ファン4により熱交換器5へ送風される。そして、熱交換器5を通過して熱交換された空気は再び室内へ送風される。このとき、主ファン4と共に回転するアルミニウム製補助ファン11は、空気調和機本体1の天板と主ファン4の主板との隙間を流れ、主ファン4の風穴4aを通過する流れbを吸引し、ファンモータ3の周囲を流れる流量を増大できるの

で、ファンモータ3の外殻を冷却できるとともに、補助ファン11は、熱伝導性に優れた金属であるアルミニウムで構成され、ファンモータ3のロータシャフト3aと直接接触しているので、ファンモータ3のロータシャフト3aから補助ファン11への直接的熱伝導による放熱もでき、さらにファンモータの冷却効果を向上できる。また、補助ファン11の基板は、主ファン4に対向する側の面と反主ファン側の面の両方が主ファン4の中心部（ボス部）近傍の凸面形状に略沿うように湾曲している

10 ため、主ファン4の風穴4aからの流れbは補助ファン11で風向偏向されて羽根側へ吹き出す。さらに、吸込口2側からの流れを主ファン4の主板に沿うように風向偏向するので、補助ファン11周辺の空気の流れの乱れも少なくできる。

【0026】以上のように本実施例では、空気調和機本体1の天板の壁面に対して垂直に、取付部材を介して天板の中央部に取り付けられたファンモータ3と、ファンモータ3のロータシャフトに取り付けられ、主板の中心部(ボス部)近傍に複数の風穴4aを有し、前記主板の

20 内周部分が反天板側（吸込口 2 側）に膨出されてその膨出部分の内側面が前記天板の壁面とともにファンモータ 3 を収納する空間を形成し、前記主板の外周部の反壁面側に複数の羽根が設けられ、ファンモータ 3 により回転させられて、回転軸方向の反ファンモータ側（吸込口 2

側)から空気を吸い込み、半径方向外周側(熱交換器5側)に吹き出すとともに、半径方向外周側に吹き出された空気の一部が、前記主板と前記天板の壁面との隙間からファンモータ3の周囲を通過した後に風穴4aから出でていき吸い込み空気と合流する主ファン4と、主ファン4の反ファンモータ側(吸込口2側)に、ファンモータ3のロータシャフト3aに直接接触させて取り付けられたファンモータ3により主ファン4と同時に回転せら

ファンセクション3により主ファン4とともに回転させられ、風穴4aが回転軸方向の反ファンモータ側（吸込口2側）から見えなくなる大きさの基板を有し、前記基板は主ファン4に対向する側の面と反主ファン側の面の両方が主ファン4の中心部（ボス部）近傍の凸面形状に略沿うように湾曲しており、前記基板における主ファン4に対向する側の面の外周部に略放射状に突出する複数の羽根11aを有するアルミニウム製補助ファン11とを

40 備えたので、ファンモータ3の周囲を流れる空気流量が増大し、ファンモータ3の外殻温度を下げて巻線温度を低減できる。また、補助ファン11は、熱伝導性に優れた金属であるアルミニウムで構成され、ファンモータ3のロータシャフト3aと直接接触しているので、ファンモータ3のロータシャフト3aから補助ファン11への直接的熱伝導による放熱もでき、さらにファンモータの冷却効果を向上できる。また、主ファン4の反ファンモータ側（吸込口2側）に取り付けられる補助ファン11は、風穴4aが回転軸方向の反ファンモータ側（吸込口50 2側）から見えなくなる大きさの基板を有し、風穴4a

の吸込口 2 側を広く覆っているので、主ファン 4 の風穴 4a を通って室内に漏れてくるファンモータ 3 の運転音を十分に低減できる。さらに、補助ファン 11 の湾曲形状により補助ファン 11 周辺の空気の流れの乱れも少ないので空気の流れの乱れによる騒音を低減できるとともに、流量特性も向上できる。なお、本実施例では、金属製の補助ファン 11 をファンモータ 3 のロータシャフト 3a に直接接触させて取り付けているが、金属部材を介して間接的にロータシャフト 3a に取り付けても同様の効果が得られる。

【0027】

【発明の効果】以上のように本発明の送風機は、ファンモータを冷却する空気流の出口となる遠心型の主ファンの中心部近傍に形成された複数の風穴が回転軸方向の反ファンモータ側から見えなくなるように、前記主ファンの反ファンモータ側に、前記ファンモータにより主ファンとともに回転するように取り付けられ、前記主ファンに対向する側の面の外周部に略放射状に突出する複数の羽根を有する補助ファンを備えたことにより、ファンモータの周囲を流れてファンモータの外殻を冷却する空気量が増大し、ファンモータの冷却効果を向上させることができる。また、主ファンの風穴を通って室内に漏れてくるファンモータの運転音を低減できる。

【0028】また、さらに、補助ファンを、主ファンに對向する側の面と反主ファン側の面の両方が主ファンの中心部近傍の凸面形状に略沿うように湾曲したものとすることにより、補助ファン周辺での空気の流れの乱れを*

* 防止でき、空気の流れの乱れによる騒音を低減でき、流量特性を向上できる。

【0029】さらに、補助ファンを金属製とし、ファンモータのロータシャフトに直接接触させて、または金属部材を介して間接的に、ロータシャフトに取り付けることにより、ファンモータのロータシャフトから補助ファンへの直接的または間接的熱伝導による放熱もでき、さらにファンモータの冷却効果を向上できる。

【図面の簡単な説明】

10 【図1】本発明の第1の実施例における空気調和機の縦断面図

【図2】同実施例における部品図

【図3】本発明の第2の実施例における空気調和機の縦断面図

【図4】同実施例における部品図

【図5】本発明の第3の実施例における空気調和機の縦断面図

【図6】従来の空気調和機の縦断面図

【図7】同実施例における部品図

【符号の説明】

3 ファンモータ

3a ロータシャフト

4 主ファン

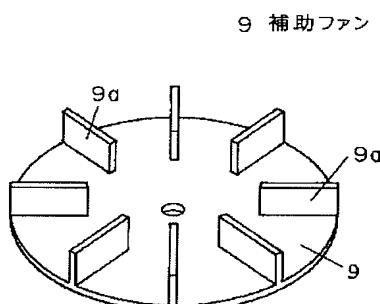
4a 風穴

9 補助ファン

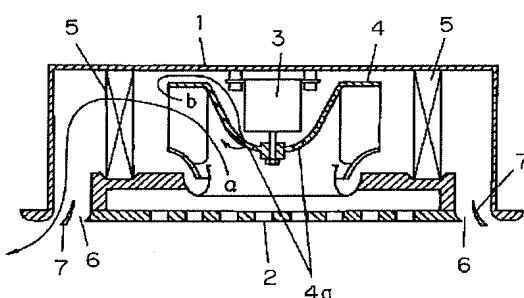
10 補助ファン

11 アルミニウム製補助ファン

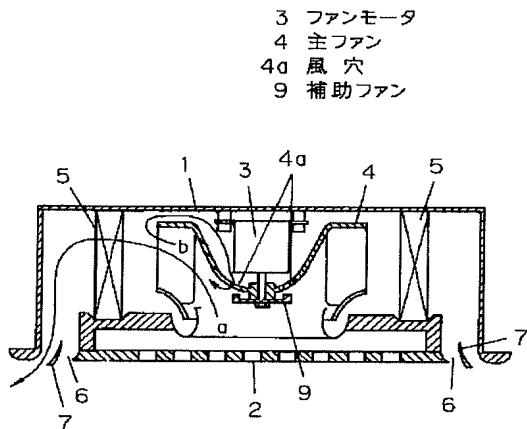
【図2】



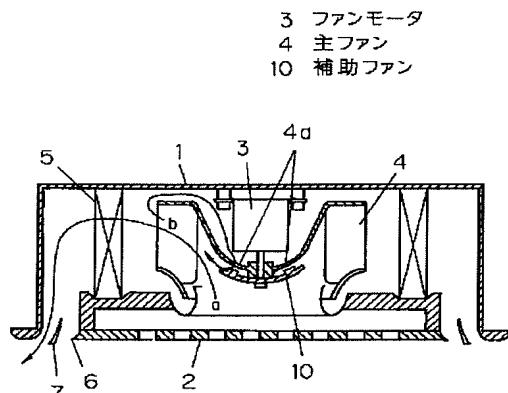
【図6】



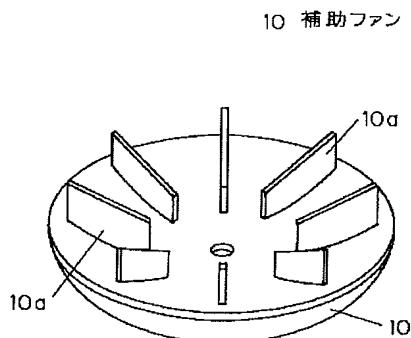
【図1】



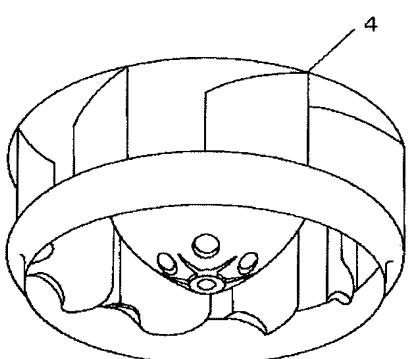
【図3】



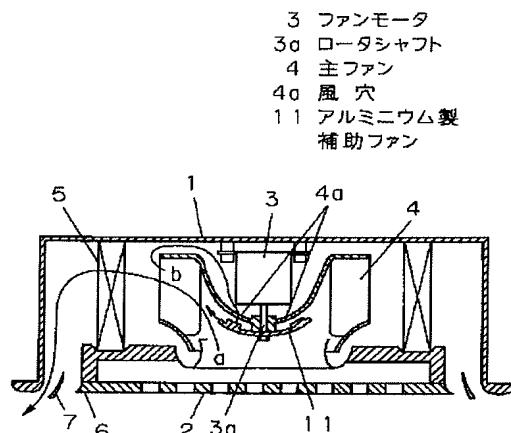
【図4】



【図7】



【図5】



フロントページの続き

(58)調査した分野(Int.Cl. ⁷, D B名)

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